

BEAMHIT: This Marksmanship Training System Uses Lasers and Can Go Anywhere

by Captain Eric G. Dulin

The BEAMHIT 330A and 110 Marksmanship Training Systems are indoor, laser-activated target engagement systems that can accurately engage targets, using actual weapons, without the use of live ammunition. These devices can be used for both basic and advanced marksmanship instruction. The major components of the systems include a laser transmitter, a laser transmitter rod, and a target sensor. The laser transmitter is adaptable to multiple weapons systems by the use of different laser transmitter rods. One end of the rod screws into the laser, and the other end of the rod fits into the barrel of the weapon. Vibrations from the weapon's firing mechanism trigger the laser when the weapon is dry fired. The systems require no ammunition of any kind. 9mm rods are standard with both BEAMHIT systems and both the M16A2 and M4 carbines can be used with an optional laser transmitter rod.

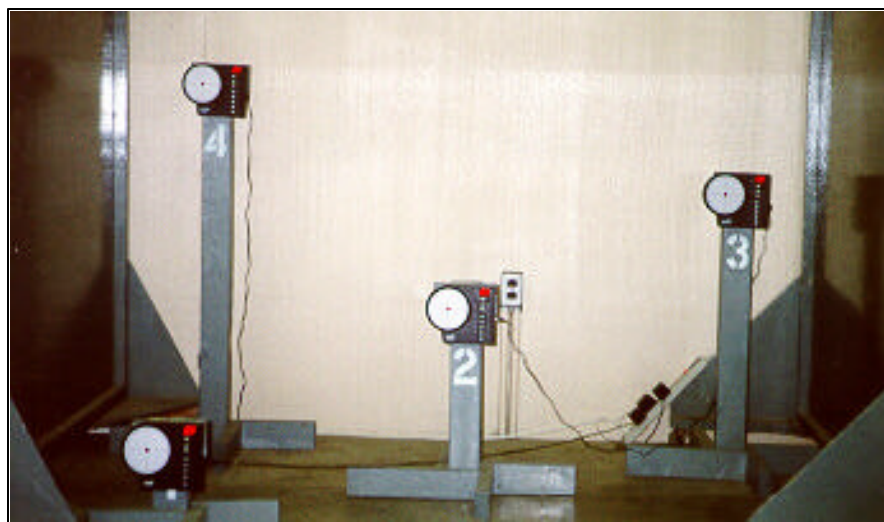
The differences between the two types of BEAMHIT systems are the size of the target, the feedback provided by the target, and the components required for more detailed feedback. The 330A system consists of a ten-inch, circular bull's-eye laser target with power supply, a laser transmitter, a 9mm-transmitter rod, a computer program, and electrical cables to connect the target to a 286 or higher computer. Once connected to the computer, the target's eye face is displayed on the monitor. When a soldier fires at the target, the laser beam emitted from the soldier's weapon strikes the face of the target, causing the target to emit a beep. The target instantaneously transmits the location of the laser strike to the computer, and displays it on the monitor. Subsequent laser beam strike locations appear on the monitor, and the distance between each laser hit, (the shot group dispersion) is measured.

The 110 system is a smaller eight-inch target that consists of a circular bull's-eye target with power supply, and a laser transmitter with a 9mm-transmitter rod. This target system provides hit or miss feedback to the shooter. When the laser hits the target, the target emits a beep, and displays the number of hits obtained on the right side of the target. The photo



SGT Frank Megow, an instructor at C 3-81 AR, engages a 330A target using a pneumatic M4 carbine.

Below, a station of the BEAMHIT 110 M9 minirange. Targets are called off in a timed sequence providing challenging and realistic training.



above illustrates the use of four BEAMHIT 110 targets on the M9 mini-range.

Both systems are compatible with M4, M16A2, and 9mm weapons. When actual M4 carbines and M16A2 rifles are used with these systems, they must be recharged, by pulling back on the charging handle after each shot. The recharging action after each shot requires the soldier to break the cheek to stock weld. Although this is not a problem for an experienced shooter, such as a National Guard soldier practicing at the

armory, this can be a difficult problem for a beginning shooter to overcome, and does not assist in teaching the proper basic marksmanship fundamentals. The photo at right illustrates pneumatic replicas of M4 carbines and M16A2 rifles that BEAMHIT designed for use in basic rifle marksmanship training. Both pneumatic rifles automatically fire every time the trigger is pulled, and do not have to be recharged. Soldiers who train on the M9 using the BEAMHIT system fire single action with no adverse impact on training, however, BEAMHIT has developed a pneu-

matic device to cock the M9 after firing, and provide a simulated recoil.

C Company, 3-81AR, the basic rifle marksmanship company for the 1st Armored Training Brigade, Fort Knox, Kentucky, uses the 330A system to train 19K and 19D One Station Unit Training (OSUT) soldiers, and basic training (BCT) soldiers, on the fundamentals of marksmanship. 19K OSUT soldiers receive training using the M4 carbine pneumatic rifle, while the 19D OSUT and BCT soldiers receive training using the M16A2 pneumatic rifle. The BEAM-



The pneumatic weapon replicas. From top to bottom, left to right, an M4 carbine, a laser transmitter and rod for the M4/M16A2, a pneumatic M4, an M9, a laser transmitter and rod for an M9, a pneumatic attachment for a .45 cal pistol (now available for an M9), an M16A2, a laser transmitter and rod for the M4 / M16A2, and a pneumatic M16A2.

HIT 330A system has been integrated into the program of instruction (POI) for all three groups of soldiers for use during the first day of fundamentals training. Soldiers fire a three-shot group at a 25 meter zero target placed over the 330A target 15 meters away, from both the foxhole supported and prone unsupported firing position. Each soldier must achieve a three-round shot group with a shot group dispersion of less than 40 millimeters, or four centimeters. The four-centimeter circle is the building block for follow-on 25-meter shot grouping and zeroing training. The task, conditions and standards for the BEAMHIT 330A are:

TASK: Demonstrate consistent aiming during the BEAMHIT exercise.

CONDITIONS: Given an M16A2 rifle or M4 carbine, computer target, BEAMHIT laser, and simulated foxhole, while wearing helmet and LBE.

STANDARDS: Each soldier will fire two three-round shot groups, one from the foxhole supported, and one from the prone unsupported, each three-round shot group must fit within a four centimeter circle.

The BEAMHIT 330A system allows the soldier to observe the strike of each round and monitor the dispersion. A drill sergeant or a marksmanship instructor critiques the shooter during firing for obvious fundamental errors. After the soldier finishes firing, the soldier and the instructor examine the computer screen. The pattern of the rounds on the screen can indicate fundamental shooting errors, such as improper breathing or trigger jerking, as indicated in FM 23-9. The photo on the next page illustrates the feedback received from firing the BEAMHIT 330A system.

The 330A system is an integral part of the 19K OSUT program of instruction for

the M4 carbine. This system provides maximum benefit to the 19K soldier because the Weaponeer shooting system that Ft. Knox uses for 19D OSUT and BCT marksmanship instruction is not compatible with the M4 carbine.

SFC David Parker, SSG Michael Love, and SSG Uwe Thon, instructors at C 3-81 AR, developed a BEAMHIT 330A and 110 training system that provided enormous benefit for 19K 9mm instruction and

was incorporated into the POI. The 330A system is used to develop basic shooting skills by measuring the shot group dispersion of a 12-round shot group fired at the 330A target at a distance of 15 meters. A soldier engages the target from the standing crouched position using the two-handed grip. The soldier is monitored by a drill sergeant or marksmanship instructor again for obvious shooting errors, such as improper breathing or trigger jerk. Once the soldier fires all 12 rounds, the soldier and the coach observe the computer screen and critique his performance by using the round strikes displayed on the screen.

The task, conditions, and standards for the BEAMHIT 330A are:

TASK: Engage a 15-meter BEAMHIT target using a M9 9mm pistol and laser transmitter with a shot group dispersion of 120mm or less.

CONDITIONS: Day, from a standing firing position, engage targets from a given distance using the M9 9mm pistol with laser transmitter device, firing single action, while wearing helmet and LBE.

STANDARDS: Soldiers must obtain 9 out of 12 registered hits within 120mm to receive a GO.

The BEAMHIT 110 system is used to develop more advanced shooting skills such as target acquisition and en-

gagement. Forty BEAMHIT 110 systems have been linked together to create a miniature, indoor 9mm pistol range. The targets are arrayed in ten four-target stations run as a complete firing order. Ten soldiers simultaneously engage the four targets at ranges of eight to ten meters as the target numbers are called off. The size of the targets, the minimal amount of time between engagements, and several simultaneous engagements, create challenging, realistic training.

The task, conditions, and standards for the BEAMHIT 110 system are:

TASK: Engage BEAMHIT 110 targets at eight meters using the M9 9mm pistol and laser transmitter.

CONDITIONS: Day, from a standing position, at a given distance, using an M9 9mm pistol with laser transmitter device, firing single action, while wearing LBE and Kevlar.

STANDARDS: The soldier must obtain eight registered target hits out of a possible twelve targets, with a minimum of two hits on each target to receive a GO.



SGT Megow engages the BEAMHIT 330A from the prone unsupported position. The tank to his right supplies energy for re-cocking and simulates the weapon's "kick."

The BEAMHIT systems were first used for 9mm marksmanship training. An initial study conducted after their implementation into the POI showed an increase in the number of soldiers who qualified the first time, an increase in the number of soldiers who qualified expert, and a decrease in the average number of rounds needed to qualify each soldier. The BEAMHIT system was integrated into the 19K and 19D POI as a supplement to the target box exercise. The use of the BEAMHIT system provides each soldier an additional opportunity to fire simulated rounds and gain confidence in his shooting ability prior to firing live rounds for the first time. The pneumatic weapon, life-sized target, and four centimeter standard provide a realistic training experience.

The BEAMHIT system is a cost-effective training system. Although the primary purpose of the BEAMHIT is basic marksmanship training, both systems are excellent tools for marksmanship training prior to weapons qualification, and are frequently used by permanent party units on Fort Knox. The BEAMHIT is also useful to National Guard or ROTC units who need to conduct marksmanship training, but can no longer use indoor ranges. During the TRADOC Commander's Conference at Fort Knox in 1997, BEAMHIT unveiled the new BEAMHIT 2000, which is a "virtual reality" range. The BEAMHIT 2000 can use a picture to create a realistic, working, scaled, indoor reproduction of a weapons range, which operates with such simple tools as a computer, a bed sheet for a projection screen, and the laser transmitters and rods used with the BEAMHIT 330A and 110 systems. The device is very impressive, and could be extremely useful for forward-deployed units to conduct basic and advanced marksmanship training to include "virtual qualification."

POINTS OF CONTACT

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SSG Uwe Thon, one of the three soldiers who developed the M9 POI, engages the BEAMHIT 110 systems during a M9 minirange exercise.



The results of SGT Megow's three-round shot group. The darker circle on the monitor indicates the center of mass of the three-round group. The results are within the 40mm dispersal required.

CPT Eric G. Dulin was commissioned in Armor from the Louisiana State University ROTC program in 1993. He served in 5-17 Cavalry, Korea, as a scout platoon leader, troop executive officer, and support platoon leader. He was assigned to Ft. Knox where he served as an executive officer for B 281 AR, a 19K OSUT training company, and as the commander for C 3-81 AR. He is currently a student in the Armor Officer Advanced Course.